Abstract of the Disclosure

Methods and systems for compensating magnetic current loops provide current magnitude and phase uniformity within the magnetic current loops. A magnetic current loop is divided into k sections. Each of the k sections has a

5 series reactance. Series reactive compensation is added to each of the k sections such that the reactive compensation substantially cancels the series reactance of each section. Adding reactive compensation to the loop that cancels the series reactance of each section of the loop provides current magnitude and phase uniformity along the loop at any given instant in time.

10 As a result, the magnitude and phase of the magnetic field at a point in space can be controlled with precision to achieve a desired result, such as precise field cancellation or precise field generation.